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PROGRESS REPORT
FOR
MAY 1955
ON
4-INCH ROCKET

16 June 1955

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Work for the month of May concerned further efforts to improve the design of the long range model and flight testing of those units.

Three, five tube models were constructed, each weighing 4 lb. 9 oz. and containing 233 grams of propellant powder. The range of the models, calculated from their mass ratios, was estimated to be 2,000 yards. Each had nozzles 0.468" in diameter giving a K_n value of 125 which was considered to be as low as was permissible.

The first model took off well, rapidly went out of sight and has not yet been found. The second unit apparently "tipped off" as it left the launcher, since, upon recovery, it was found to have three broken tubes. The third unit took off much like the first unit but was recovered at a later date about 3,000 feet away. Since this unit was found with one tube missing, it could not be determined if this was the cause of failure to achieve the estimated range or whether the tube broke upon landing. Since the expected range was not achieved, the tube probably broke off during flight before all the powder was burned.

The major portion of the month was taken up by the construction of ten flight models, two of which were short range and eight were long range. All were made as five tube models and carried in the body cavity a red smoke candle which had a five-minute burning time. The body wall had four 1/2" holes through it to permit the smoke to escape. As was expected, the smoke trail was visible in flight and also marked the landing spot.

The two short range models performed satisfactorily, going 460 and 525 yards respectively. Each weighed five p pounds and had a 118 gram charge of propellant.

Little success can be claimed for the eight long range models since each failed due to either nozzle or tube blowout. One model might have flown successfully but the body and ogive separated from the motor thus increasing the air resistance of the separated parts. Although a portion of the troubles arose through the heat evolved from the smoke candle, most of the failures were caused by weakness of the bond.

Plans for Future Work

At the present time it is felt that the best chance for success on the long range model lies with redesign of the

motor section so that the unit can better withstand the severe strains of both pressure and acceleration. In addition, a search will be made for a bonding resin having the highest possible bonding strength.

Work will start on a model whose design is expected to overcome the defects of the previous units, namely, tube and nozzle blowout. If possible, this redesigned model will have no need for the multiple bolting system now used. Static tests will be made on motor components to test the utility of the design.

Financial Status

50X1

Total Contract Amount (Phase I and II)	
Expenditures During May 1955	
Total Expenditures to May 31, 1955	
Total Unexpended Balance	

Expiration Date - November 1, 1955